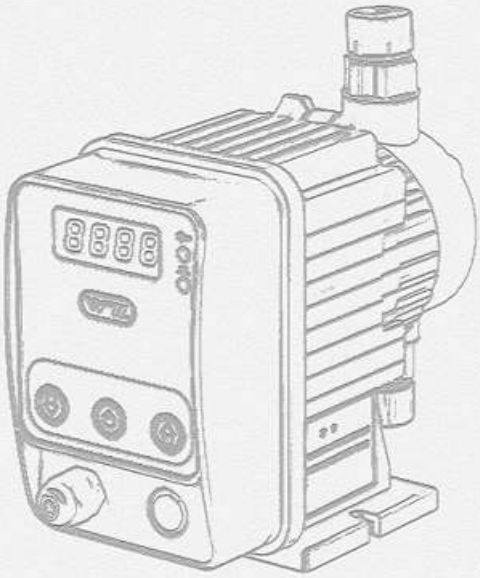
ELECTROMAGNETIC DIAPHRAGM METERING PUMP

OPERATION MANUAL



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1. 安全说明 Safety Notes

使用化学介质时，务必遵守基本的安全预防措施，以降低火灾、电击和人身伤害的危险。In use of chemical mediator, basic safety precautions must be followed to reduce danger of fire hazard, electric shock and personal injury.

请阅读所有说明 Please read all the instruction.

- 不要输送易燃液体。Don't transport flammable liquid.
- 操作化学计量泵或在其附近工作时务必穿戴防护服，包括手套和护目镜。When you operate chemical metering pump or work near it, you must wear protective clothing, including gloves and safety goggles.
- 定期检查管道有无破裂或老化，需要时更换。（检查管道时一定要穿戴防护服和护目镜。）Check the pipeline regularly to find out whether there is any fracture or aging. Replace the pipeline when it is necessary. (You must wear protective clothing and goggles when you check the pipeline.)
- 遵守化学药品制造商提供的说明和警告信息。用户有责任确认化学药品与计量泵的兼容性。Follow the instruction and warning information provided by the manufacturer of chemicals. The users are responsible for confirm the compatibility of the chemicals and the metering pump.
- 确认计量泵铭牌上的电压与装置电压是否一致。如果泵不能启动，检查管线电压。Confirm whether the voltage on the nameplate of the metering pump is the same with the voltage of the device. If the pump can't be started, check the voltage of the pipeline.
- 处理饮用水时应向当地的卫生官员和水质处理专家咨询。In treatment of drinking water, consult the local health officials and water treatment experts.
- 安装或断开计量泵管道前一定要使系统减压。You must reduce the pressure of the system before installing or disconnecting the pump pipeline.
- 如果注入点低于化学药品储槽和泵，则应安装反虹吸阀。If the injection point is lower than the storage tank of chemicals and the pump, syphonage-proof valve should be installed.

- 不要修改泵。这样会造成潜在的危险，并使质量担保失效。Don't modify the pump, because it will cause potential danger and make quality guarantee lose efficacy.
- 所有泵在出厂前都做过水输送试验。如果输送的化学药品会和水起反应（如硫酸）则需卸下管道彻底干燥。Before leaving the factory, water transport test should be made for all pumps. If the transported chemicals react with water (for example, sulfuric acid), it needs to dismount the pipeline and dry it thoroughly.
- 安装前应向持证管工和电工咨询，安装应符合当地规范。Before installation, consult the plumbers and electricians with certificates. Installation should conform to the local regulations.
- 计量泵必须在所用工况下校准，以获得精确的体积输出。The metering pump must be calibrated in the working conditions to be used, in order to acquire accurate volume output.

2. 介绍 Introduction

- 此手册包含电磁隔膜计量泵安装、操作和维护说明的相关信息。可参阅泵的铭牌确定实际型号。This manual includes relevant information about installation, operation and maintenance instruction of electromagnetic diaphragm metering pump. Refer to the nameplate of the pump to confirm the actual model.

2.1 运行原理 Operation Principle

- 电磁隔膜式计量泵是用来输送化学药品或流体的设备。当通电时，电磁线圈产生磁场使得推杆运动隔膜产生形变，通过止回阀的作用，流体在压力作用下输送到出口。当电磁线圈断电时，在弹簧的作用下隔膜复位，将液体吸入泵头，完成一次液体的输送。

- Electromagnetic diaphragm metering pump is the equipment used for transporting chemicals or liquid. When power of it is on, the electromagnetic coil generates magnetic field which makes the movement diaphragm of push rod deform. With the effect of check valve, the liquid is transported to the outlet under the pressure effect.

When power of electromagnetic coil is off, the diaphragm is reset under the effect of the spring. The liquid will be sucked into the pump head. And one time of liquid transport is completed.

2.2 基本参数 Basic Parameters

- IP55 防护等级； Protection grade of IP55
- 防腐塑料外壳； Antiseptic plastic shell
- 标准电源220VAC，50 Hz； Standard power supply 220VAC，50 Hz

2.3 计量泵的材质表（与介质接触部分） Material Table of Metering Pump (the part contacting with the mediator)

- 隔膜 Diaphragm：PTFE
- 泵头 Pump head：PVC，PP
- 单向阀 One-way valve：PVC，PP
- 阀球 Valve ball：CERAMIC
- 密封件 Sealing element：FPM
- 吸液管 Pipette：PVC，PE，PTFE
- 出液管 Outlet pipe：PE，PTFE

2.4 规格参数 Specification Parameter

2.4.1 S系列规格参数表 S Series Specification Parameter

型号 Model	流量 Flow（L/h）	压力 pressure（bar）	冲程频率 Stroke Frequency（次/min）	吸程 Suction Height（m）	功率 Power（W）	电源 Power	重量 Weight（kg）
-01-07-S	1	7	120	2	25	220V 50IIZ	2.3
-02-07-S	2	7	120	2	25	220V 50HZ	2.3
-03-07- S	3	7	120	2	25	220V 50IIZ	2.3
-06-05- S	6	5	160	2	25	220V 50HZ	2.3
-09-03- S	9	3	180	2	25	220V 50IIZ	2.3

2.4.2 M系列规格参数表 M Series Specification Parameter

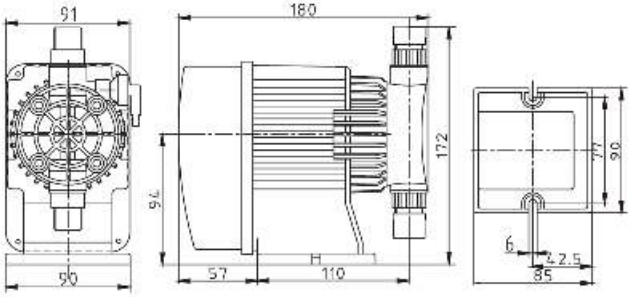
型号 Model	流量 Flow（L/h）	压力 pressure（bar）	冲程频率 Stroke Frequency（次/min）	吸程 Suction Height（m）	功率 Power（W）	电源 Power	重量 Weight（kg）
-01-07-M	1	7	120	2	25	220V 50HZ	2.6
-02-07-M	2	7	120	2	25	220V 50HZ	2.6
-03-07-M	3	7	120	2	25	220V 50IIZ	2.6
-06-05-M	6	5	120	2	25	220V 50HZ	2.6
-06-07-M	6	7	120	2	50	220V 50IIZ	2.6
-09-03-M	9	3	120	2	25	220V 50HZ	2.6
-09-07-M	9	7	160	2	50	220V 50IIZ	2.9
-12-07-M	12	7	160	2	50	220V 50HZ	2.9
-15-03-M	15	3	160	2	50	220V 50HZ	2.9
-20-03-M	20	3	180	2	50	220V 50IIZ	2.9

2.4.3 L系列规格参数表 L Series Specification Parameter

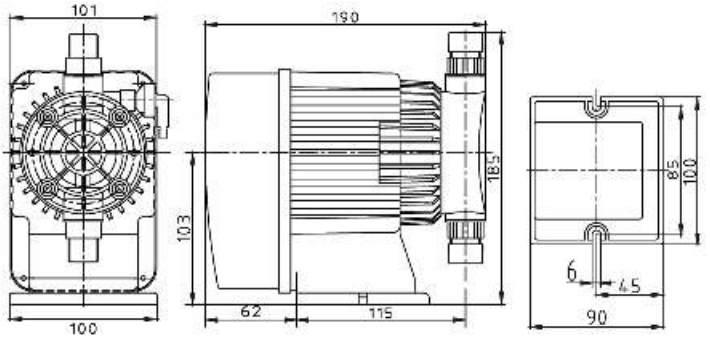
型号 Model	流量 Flow（L/h）	压力 pressure（bar）	冲程频率 Stroke Frequency（次/min）	吸程 Suction Height（m）	功率 Power（W）	电源 Power	重量 Weight（kg）
-20-05-L	20	5	180	2	80	220V 50IIZ	5.2
-30-03-L	30	3	180	2	80	220V 50HZ	5.2
-40-02-L	40	2	180	2	80	220V 50IIZ	5.2

2.5安装尺寸图 Installation Dimension Drawing

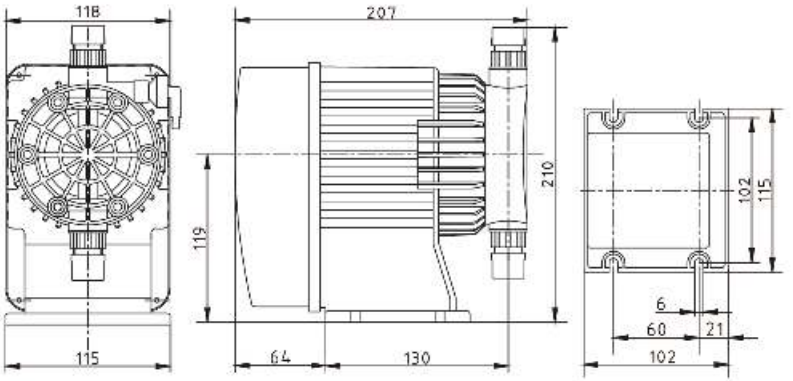
2.5.1 S系列安装尺寸图S Series Installation Dimension Drawing



2.5.2 M系列安装尺寸图M Series Installation Dimension Drawing



2.5.3 L系列安装尺寸图L Series Installation Dimension Drawing



3. 安装 Installation

➢ 计量泵所在位置应方便其与化学药品储罐和注入点的连接。泵采用防水防尘设计，可室外使用，但是不要浸没在水中使用。避免温度超过40℃（104℉），否则会损坏泵。The position of metering pump should be convenient for connecting with storage tank of chemicals and injection points. The pump adopts waterproof and dustproof design. It can be used outdoor. However, don't immerse it into water in use and avoid the temperate above 40℃（104℉）, or the pump will be damaged.

3.1 安装方式 Installation Method

➢ 浸灌式安装（理想安装）。（如图1）Immerse and irrigation type installation (ideal installation) (as shown in Fig.1)

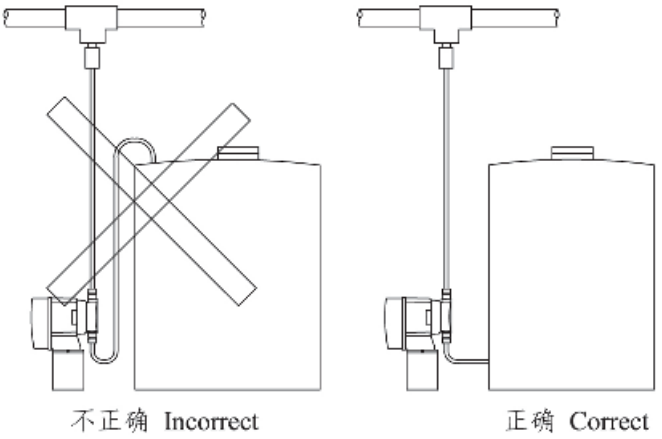


图 1 Fig. 1

➢ 吸入提升式安装。当吸入水头小于1.5米时，对于比重不大于水的溶液可采用此种安装方法。如溶液比重较大时请与厂家联系。（如图2）

➢ Sucking and lifting type installation. When the suction head is less than 1.5 m, this installation method can be adopted for liquid with the specific gravity no higher

than that of water. If the specific gravity of the liquid is higher, please contact the manufacturer. (as shown in Fig.2)

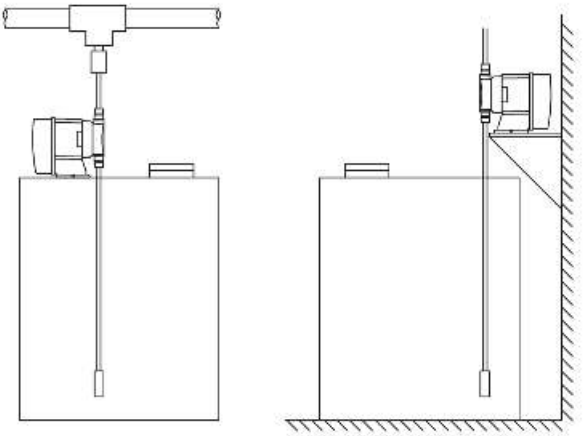


图 2 Fig.2

注意：注入点必须高于溶液供应罐顶部，以阻止重力送料，除非注入点总是有合适的背压。安装抗虹吸阀门可以阻止重力送料。

Note: the injection point must be higher than the top of the liquid supply tank, in order to prevent gravity feeding, unless there is always suitable backpressure at the injection point. Installation of syphonage-proof valve can prevent gravity feeding.

3.2 电气接线 Electric Connection

- 计量泵带有 1.5 米的随机电缆，安装时计量泵和电源之间应装空气开关。安装应符合当地的电气安装规范.The metering pump has 1.5 meters of cable. When it is installed, air switch should be installed between the pump and the power supply. Installation should conform to the local specification for electric installation.

注意：接线时要确保供电回路已经断开

Note: in electric connection, ensure that the power supply circuit has been disconnected

3.3 控制接线 Control Wiring:

- 手动计量泵可根据用户要求选装远程控制启停接口，接口信号应为干接点的开关信号，常开运行或常闭运行可选。（如图3）；Manual control metering pump can be equipped with optional long-distance controlling start-stop interface. The interface signal is switching signal for the dry contact. It is optional for normal open operation and normal close operation. (as shown in Fig.3)

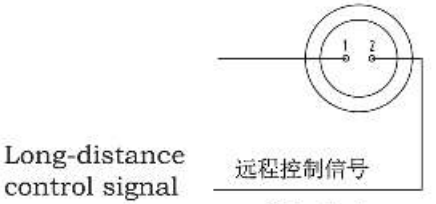


图 3 Fig. 3

- 脉冲控制计量泵；Pulse control metering pump
  - ✓ 脉冲计量泵的接口有两个：脉冲控制接口和远程控制启停接口（选装）；The pulse metering pump has two interfaces: pulse control interface and long-distance control start-stop interface (optional)
  - ✓ 脉冲控制接口：接口信号为有源脉冲信号或无源的开关信号；Pulse control interface: the interface signal is active pulse signal or passive switching signal
  - ✓ 远程控制接口：接口信号为干接点的开关信号，常开运行或常闭运行可选。（如图4）Long-distance control interface: the interface signal is switching signal for dry contact. It is optional for normal open or normal close (as shown in Fig.4)



图 4 Fig. 4

- 如果产生脉冲信号的传感器的电源为5VDC，计量泵可为其提供电源。（如图5）；If the power supply of sensor generating pulse signal is 5VDC, the metering pump can provide power supply for it (as shown in Fig.5)

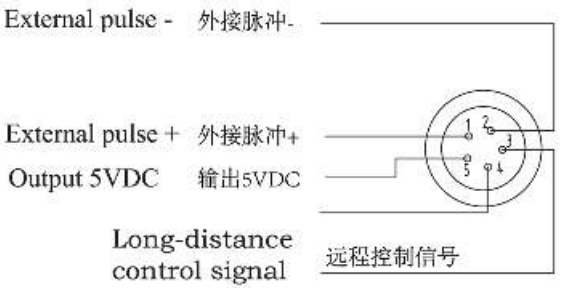


图 5 Fig. 5

- 注意：外接脉冲信号如果是有源脉冲信号，必须注意正负极方向，航空插件编号为1的端子必须接正极，航空插件编号为2的端子必须接负极。一旦接反会使得计量泵无法正常工作。Note: if the external pulse signal is active pulse signal, pay attention to the direction of positive and negative electrode. The No.1 terminal of aerial linker must be connected to positive electrode and the No.2 terminal of aerial linker must be connected to negative electrode. Once it is connected incorrectly, the metering pump won't work normally.
- 4~20mA控制信号计量泵 4~20mA metering pump
  - ✓ 4~20mA 计量泵的接口有两个：电流控制接口和远程控制启停接口（选装）；4~20mA metering pump has two interfaces: current control interface and long-distance control start-stop interface (optional)
  - ✓ 远程控制接口：接口信号为干接点的开关信号，常开运行或常闭运行可选。Long-distance control interface: the interface signal is switching signal for dry contact. It is optional for normal open or normal close.
- 电流控制接口：接口信号为标准的0/4-20mA，控制方式为比例控制，比例系数可以调节，支持反比例控制。（如图6）；Current control interface: The interface

signal is the standard 0 / 4-20mA. The control method is proportional control. The proportionality coefficient can be adjusted. It supports reverse-proportion control. (as shown in Fig.6)

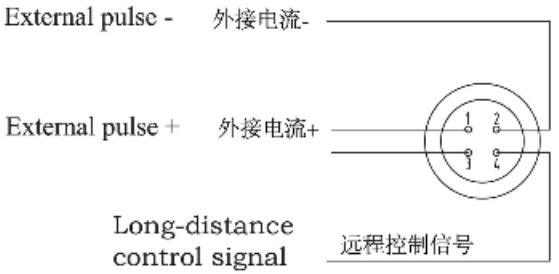


图 6 Fig. 6

注意：外接电流信号必须注意正负极方向，航空插件编号为1 的端子必须接正极，编号为 2的端子必须接负极。一旦接反会使得计量泵无法正常工作。

Note: attention must be paid to direction of positive and negative electrode. The No.1 terminal of aerial linker must be connected to positive electrode and the No.2 terminal must be connected to negative electrode. If it is not connected correctly, the metering pump won't work normally.

3.4 管线连接 Pipeline Connection

- 计量泵带有2米吸液管、2米出液管、底阀过滤器和喷射阀。吸液管为透明软管，一端接底阀过滤器，另一端接计量泵的进口阀。出液管为半透明白色软管，一端接计量泵出口阀，一端接喷射阀，在把出液管连接到出口阀之前，可向出口阀内灌入少量水，这样可以减少计量泵的排气时间。（如图7）
- The metering pump has 2 meters of pipette and 2 meters of outlet pipe, bottom valve filter and injection valve. The pipette is transparent hose. One end of it is connected to the bottom valve filter and the other end is connected to the outlet valve of the metering pump. The outlet pipe is transparent white hose. One end of it is connected to the outlet valve and the other end of it is connected to the injection valve. Before the outlet pipe is connected to the outlet valve, a small volume of water can be injected into the outlet valve in order to reduce the exhaust time of the metering pump. (as shown in Fig.7)



图 7　Fig.7

4. 启动和调试 Start and Debugging

4.1 手动计量泵调试 Debugging of Manual Metering pump

➢ 手动计量泵的面板按键和指示灯的分布。（如图 8）；Distribution of button and indicator light of manual metering pump (as shown in Fig.8)

- ✓ Power：电源指示灯；Power: indicator light for power supply
- ✓ ⎍⎍指示灯：工作指示灯；Indicator light: work indicator light
- ✓ Start / Stop：开关键；Start/Stop: on-off key
- ✓ △：数字增加键；△： Figure increasing key
- ✓ ▽：数字减小键；▽: figure reducing key



图8　Fig.8

➢ 按规范为计量泵接通电源，Power 指示灯亮，按下 Start / Stop 键，计量泵开始工作，面板显示频率为计量泵工作频率。数码管最后一位"H"闪烁为停止状态，不闪烁为工作状态。

➢ Switch on the metering pump according to the specification. The Power indicator is on. Press start/stop key and the metering pump starts working. The panel display

frequency is the work frequency of metering pump. If the "H" of the last digit of the nixie tube flickers, it is stop status. If it doesn't flicker, it is working status.

- 按△或▽键，调节计量泵的输出流量。Press △or ▽ to adjust the output flow of the metering pump.

4.2 脉冲计量泵调试 Debugging of pulse metering pump

- 脉冲计量泵的面板按键和指示灯的分布。（如图 9）；Distribution of button and indicator light of pulse metering pump (as shown in Fig.9)
  - ✓ Power：电源指示灯；Power: indicator light for power supply
  - ✓ 灯指示灯：工作指示灯；Indicator light: work indicator light
  - ✓ Start / Stop：开关键；Start/Stop: on-off key
  - ✓ △：数字增加键；△： Figure increasing key
  - ✓ ▽：数字减小键；▽: figure reducing key
  - ✓ ADJ：功能键；ADJ: function keys
  - ✓ A/M：手 / 自动切换键；A/M: Manual/Automatic switch key



图 9 Fig.9

- 按规范为计量泵接通电源，Power指示灯亮，按下Start/Stop键，计量泵开始工作，面板显示频率为计量泵工作频率。按住A/M键3秒可切换运行方式。数码管最后一位"H"代表手动，"P"代表自动，闪烁为停止状态，不闪烁为工作状态
- Switch on the power supply for the metering pump according to the specification. The power indicator light is on. Press the Start/Stop key and the metering pump begins to work. The panel display frequency is the work frequency of metering pump. Press the A/M key for three seconds to switch the operation method. The last digit "H" of Nixie tube represents manual operation, "P" represents automatic operation. If it flickers, it is in stop status. If it doesn't flickers, it is work status.
- 手动参数设置参见4.1节。See section 4.1 for manual parameter setting
- 计量泵工作在自动状态时，可根据外部输入的脉冲频率自动调节流量。When the metering pump work is in automatic status. The flow can be adjusted

automatically according to the pulse frequency of input from the external.

- 本系列计量泵内置分频和倍频的功能。在自动状态下同时按住"ADJ"键和"A/M"键可进入分频、倍频功能菜单；The metering pump of this series has the functions of built-in fractional frequency and frequency multiplication. In automatic status, press the "ADJ" key and "A/M" key at the same time to enter the function menu of fractional frequency and frequency multiplication:
  - ✓ 第一个参数显示：0011倍频系数；The first parameter display: 0011 frequency multiplication coefficient
  - ✓ 按Start/Stop键进入：Press Start/Stop key to enter:
  - ✓ 第二个参数显示：0012分频系数；The second parameter display: 0012 fractional frequency factor
  - ✓ 按Start/Stop键返回。Press Start/Stop key to return.
  - ✓ 按Δ或▽键改变系数设定值。Press Δ or ▽ to change the set value of coefficient.

注意：允许外接脉冲信号最大频率为**200Hz**，如果是有源脉冲信号高电平电压范围：**1.5-24V**，将与计量泵不匹配的控制信号接入计量泵所造成的损坏不在厂家的保修范围内。

Note: the allowed maximum frequency of external pulse signal is 200 Hz. For active pulse signal, the high level voltage scope is 1.5-2.4V. The damage of metering pump caused by connecting unmatched controlling signal to the metering pump is no within the warranty coverage.

4.3 4~20mA 计量泵调试 Debugging of 4~20mA Metering Pump

- 4~20mA控制计量泵的面板按键和指示灯的分布。（如图 9）：Distribution of button and indicator light of panel of 4~20mA control metering pump. （as shown in Fig.9）
- 按规范为计量泵接通电源，Power指示灯亮，按下Start/Stop键，计量泵开始工作，面板显示频率为计量泵工作频率。按住A/M键3秒可切换运行方式。数码管最后一位"H"代表手动，"P"代表自动，闪烁为停止状态，不闪烁为工作状态

- Switch on the power supply for the metering pump according to the specification. The power indicator light is on. Press the Start/Stop key and the metering pump begins to work. The panel display frequency is the work frequency of metering pump. Press the A/M key for three seconds to switch the operation method. The last digit "H" of nixie tube represents manual operation, "P" represents automatic operation. If it flickers, it is in stop status. If it doesn't flickers, it is work status.
- 手动参数设置参见4.1节。See section 4.1 for setting of manual parameter
- 计量泵工作在自动状态时，可根据外部输入的电流信号自动调节流量。When the metering pump work is in automatic status, the flow can be adjusted automatically according to the current signal input from the external.
- 在自动状态下同时按住"ADJ"键和"A/M"键可进入控制参数菜单：In automatic status, press "ADJ" key and "A/M" key to enter the control parameter menu:
  - ✓ 第一个参数显示：0041起控电流4mA；The first parameter display: 0041 starting control current 4mA
  - ✓ 按Start/Stop键进入；Press Start/Stop key to enter:
  - ✓ 第二个参数显示：0202终控电流20mA；The second parameter display: 0202 final control current 20mA
  - ✓ 按Start/Stop键进入；Press Start/Stop key to enter:
  - ✓ 第三个参数显示：0003起控电流对应的频率；The third parameter display: 0003 frequency corresponding to starting control current
  - ✓ 按Start/Stop键进入；Press Start/Stop key to enter:
  - ✓ 第四个参数显示：1204终控电流对应的频率；The fourth parameter display: 1204 frequency corresponding to the final control current
  - ✓ 按Start/Stop键返回。Press Start/Stop key to return.
  - ✓ 按△或▽键改变参数设定值；Press △ or ▽ key to change the setting value of parameter.
- 当第三个参数设定值大于第四个参数的设定值时，计量泵可实现反比例控制。When the setting value of the third parameter is larger than the setting value of the fourth parameter, the metering pump can realize reverse-proportion control.

5.日常维护 Daily Maintenance

- 日常检查泵的实际运行状况。查找是否有异常声音、过度振动、流量和压力输出低或高温[经常以最大行程速率运行时，泵壳温度可以达到160℉（70℃）]等现象。Daily inspection of the actual operation situation. Find out whether there is any abnormal sound, overvibration, low output of flow and pressure or high temperature [often, when it is operated with the maximum stroke rate, the temperature of pump shell can achieve 160℉ (70℃).]
- 要获得最佳性能，单向阀应每4-6个月更换一次。根据不同用途，可能要求更频繁的更换。阀座和阀球的反复短寿命老化通常说明需要检查选择用于该用途的过流零部件材料的适用性。若需要指导，请与供应商联系。To acquire the best performance, the one-way valve should be replaced once each 4-6 months. According to different purposes, it may require more frequent replacement. For repeated short-life aging of valve seat and valve ball, it usually shows that, it is necessary to check the applicability of material of over current parts. If guidance is needed, please contact with the supplier.
- 检查接头周围有无泄漏，或老化管道所产生的泄漏，采取适当措施，如拧紧接头或更换部件来修正泄漏。Check whether there is any leakage around the contact or leakage caused by aging pipeline. Adopt suitable measures, such as tightening the contact or replacing the parts to prevent the leakage.
- 清除泵上的脏物/碎屑，这类物质有隔热作用，导致泵的温度过高。Clean the dirt/scraps on the pump. Such materials have thermal insulation effect and can cause over-high temperature of the pump.
- 如果泵停止运行一个月以上，应清洗泵头、阀门组件，方法是泵送淡水约30分钟。如果在这种"清洗运行"后泵不能正常运行，则需更换维装阀组件。If the pump stops operation for more than one month, clean the pump head and valve subassemblies. The method is as the following: pump over fresh water for about 30 minutes. If the pump can't operate normally after this "cleaning operation", it needs to replace the subassemblies of cartridge valve.

6.常见故障及处理方法 Common Fault and Handling Method

故障;Failure	原因分析;Reason Analysis	处理方法;Handling Method
泵不能自动灌入 The pump can't inject automatically	吸入端漏气 air leakage in suction end	检查吸入端各个密封位置是否封良好，更换密封圈; Check whether each seal of the suction end is in good condition. Replace the seal ring
	泵的吸入提升过高; Suction lift of the pump is too high	降低泵的安装高度 Reduce the installation height of the pump
	介质粘度、密度过大; The viscosity and density of mediator is too high	采用浸灌式安装;Adopt immerse and irrigation installation
	出口压力过大; The pressure at the outlet is too high	打开排气阀; Open the air valve
	底阀过滤器堵塞; Clogging of the bottom valve filter	清洗底阀过滤器; Clean the bottom valve filter
流量过小;The flow is too small	泵的额定压力小于系统压力; The nominal pressure of the pump is less than the system pressure	更换高压力的计量泵;Replace with high-pressure metering pump
	单向阀密封不良; The seal of one-way valve is not good	清洗、更换单向阀; Clean and replace the one-way valve
	底阀、喷射阀堵塞 Clogging of the bottom valve and injection valve	清洗进出口管路; Clean the pipelines of inlet and outlet

	电磁铁弹簧破裂;Fracture of electromagnet spring		更换弹簧;Replace the spring
	介质粘度过大;The mediator viscosity is too high		更换计量泵，与厂商联系;Replace the metering pump and contact with the manufacturer
流量过大;The flow is over large	虹吸; syphonage		出口管路加防虹吸阀;Add syphonage -proof valve to the outlet pipeline
	注入点压力远小于泵额定压力;The pressure on injection point is much less than the nominal pressure of the pump		更换小流量计量泵;Replace with metering pump with small flow
泵不工作;The pump doesn't work	电源指示灯不亮;Power supply indicator light is not on	电源问题;Power supply problem	检查供电线路;Check the power supply circuit
		泵控制板内置保险烧毁;The embedded fuse of control panel of the pump is burnt	更换保险;Replace the fuse
	工作指示灯不亮;Work indicator light is off	控制板元器件烧毁;The components of control panel is burnt	更换控制板;Replace the control panel
	工作指示灯常亮;The work indicator light is normal on	控制板元器件烧毁;The components of control panel is burnt	更换控制板;Replace the control panel